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Applicant(s):

MITEK HOLDINGS, INC.

Invention Title:

LINTEL

The following statement is a full description of this invention, including the best method of performing it known to me/us:

LINTEL

Field of the Invention

5 This invention relates generally to prefabricated, structural framing members used in a broad range of construction applications and, more particularly, to a lintel having metal side plates.

Background of the Invention

10 Lintels are typically used as structural framing members over windows and doors, as girders to support roof and floor trusses, and in other residential, industrial, commercial and agricultural applications. Generally, lintels span the distance between two spaced supports and
15 carry structural loads, eg, the weight of the structure above the lintel.

Known lintels are frequently fabricated on-site from two pieces of nominal "2xN" lumber, eg, 2x10 or 2x12 lumber.
20 (hereinafter referred to as "chords"), and one or more pieces of filler material, eg, 1/2" thick plywood, of selected lengths for the particular application. The filler material is sandwiched between the chords, and then nails are driven through the chords and the filler
25 material to form a composite structural member. The filler material is usually required so that the actual thickness of the composite lintel matches the width of the framing members which support the lintel.

30 These known composite lintels generally have far more capacity and utilise far more materials than necessary for most applications in which they are used. Furthermore, being solid, site-built members, such lintels are time-consuming to make, heavy to carry, and labor-intensive to
35 install.

Another known type of lintel is made partly of wood and

partly of steel, and is marketed under the tradename Trifold. The known Trifold lintel includes a "J" shaped steel member having a center web portion, and integral flanges that extend in the same direction from opposing side edges of the web portion. To build a Trifold lintel, a wooden frame of desired size is constructed, and the steel member web portion is nailed or screwed to, and completely covers, one side of the wooden frame. One integral flange of the steel member extends over the top surface of the wood frame, and the other flange extends over the bottom surface of the frame. The Trifold lintel can then be installed, for example, over a window or door.

Although the Trifold lintel is lighter and utilizes less unnecessary material than the composite lintels discussed above, like such composite lintels, the Trifold lintel is time-consuming and labor-intensive to assemble because of the large number of individually driven nails or screws that normally must be used to allow the Trifold lintel to carry common roof, floor or girder loads. Further, because the web portion covers the entire side of the wooden frame upon which it is installed, it substantially impedes the application of siding and other materials to that side of the lintel.

It would be desirable to provide a lintel which does not have significant unnecessary capacity and, therefore, wastes less materials than known composite lintels. It would be desirable to provide a lintel which may be pre-fabricated in a factory for delivery to a job site to eliminate the time, expense and imprecision associated with on-site assembly. It also would be desirable to provide a lintel which is relatively light weight to reduce shipping costs to the job site and to facilitate on-site handling, and to provide a lintel to which siding materials can be readily nailed or screwed without predrilling.

Summary of the Invention

The invention provides a lintel including;

5 a top chord and a bottom chord, the top chord and the bottom chord being formed from wood;

a plurality of wood stiffenings extending between the top chord and the bottom chord;

10 a plurality of separate lintel side plates formed from metal, each lintel side plate extending between and overlapping the top chord and the bottom chord, and the plurality of lintel side plates extending along the lintel between one end of the lintel and the other end of the lintel; and

15 each lintel side plate having a first grouping of teeth for connecting the lintel side plates to the top chord, and a second grouping of teeth spaced from the first grouping of teeth, for connecting the side plates to the bottom chord.

20 More particularly, and in an exemplary embodiment, a lintel constructed in accordance with the present invention includes a generally rectangular wood frame of a height, length and thickness substantially corresponding to the dimensions of the opening in which the lintel is to
25 be installed. The frame is formed by connected first and second elongate chord members (e.g., nominal "2xN" members) that extend in spaced, substantially parallel, overlying relationship to each other.

30 In one embodiment of the subject lintel, a plurality of metal side plates are provided at predetermined locations spaced lengthwise along at least one side of the lintel frame to provide openings through which electrical, plumbing or other members may be conveniently passed
35 without the need for drilling or cutting the subject lintel. In addition, for applications where the subject lintel may be required to carry extreme loads, metal side

plates may be installed on both inner and outer sides of the lintel frame.

5 The lintel of the preferred embodiment is a structural component capable of carrying substantial loads which minimizes unnecessary materials, production costs and waste. The lintel also lends itself to being prefabricated under factory conditions to reduce assembly costs, and may be made with a generally hollow inner core to reduce shipping costs. The hollow inner core also makes the lintel relatively light weight and easy to handle on-site. Optionally, the hollow inner core may be filled, preferably with a light weight material, to provide enhanced thermal or sound insulation performance. 10 In addition, and in each of the various embodiments of the subject lintel described above, a portion of the lintel frame underlying the metal side plate is exposed, enabling convenient attachment of siding or other materials to the lintel. 15

20

Brief Description of the Drawings

Figure 1 is a front view of a portion of a building frame for a window including an exemplary embodiment of a lintel; as disclosed in the parent application; 25

Figure 2 is a perspective partially exploded view of the lintel shown in Figure 1;

Figure 3 is a schematic side view of the lintel shown in Figures 1 and 2;

30 Figure 4 is a perspective partially exploded view of an alternate embodiment of a lintel constructed in accordance with the present invention;

Figure 5 is a front view of one embodiment of a lintel constructed in accordance with the present invention and including two metal side plates installed at locations spaced lengthwise along one side of the lintel frame to provide an opening of the passage of heating, 35

electrical, plumbing or other materials;

Figure 6 is a rear view of the lintel shown in Figure 5; and

Figure 7 is a schematic side view of a lintel constructed in accordance with still yet another embodiment of the present invention and having metal side plates installed on both sides of the lintel frame.

Detailed Description

Set forth below is a description of various embodiments of lintels constructed in accordance with the present invention. The term lintel, as used herein, refers to a structural framing member which spans the distance between two spaced supports and carries structural loads, eg, the width of the structure above the lintel. Lintels typically are utilised over windows and doors, as girders to support roof and floor trusses, and in other residential, industrial, commercial and agricultural applications.

Lintel configurations according to the parent application are disclosed by way of background with reference to Figures 1 to 4.

One exemplary lintel application is illustrated in Figure 1, wherein a lintel 10 constructed in accordance with the present invention spans the width of a window opening 12 formed by building framing members 16, 18, and 20. Lintel 10 is supported on framing members 16 and 18, and lintel 10 includes a wood frame 22 and a metal side plate 24. Lintel 10 supports the weight of the structure (not shown) above window opening 12. A portion 26 of wood frame 22 underlying metal side plate 24 is exposed, which enables convenient attachment of siding or other materials to lintel 10.

Figure 2 is a perspective, partially exploded view of a

portion of lintel 10 and more clearly illustrates generally rectangular wood frame 22 which has a height, length and thickness substantially corresponding to the opening in which lintel 10 is installed above the window opening 12 (not shown in Figure 2). Frame 22 includes first and second elongate chords 28 and 30 which extend in spaced, substantially parallel, overlying relationship to each other. Chords 28 and 30 provide inner and outer side pairs of spaced substantially coplanar surfaces 32A, 32B, 33A and 33B that respectively extend to top and bottom side edges of frame 22. (Only top and bottom side edges 34 and 35 and coplanar surfaces 32A and 33a on the inner side of the frame 22 are depicted in Figure 2). Frame 22 also includes stiffening members 36 that are connected to and extend transversely between the first and second elongate chords 28 and 30. Stiffening members 36 are shown extending substantially vertically, or perpendicularly, to chords 28 and 30, although it is contemplated that the stiffening members 36 could extend diagonally, or angularly, relative to chords 28 and 30 without departing from the intended scope of the present invention. Chords 28 and 30 and stiffening members 36 may be nominal "2xN" lumber, eg, 2x4 or 2x6 lumber, of selected lengths depending upon the specific application.

Lintel 10 also includes metal side plate 24 which has first and second spaced groupings 38 and 40 of teeth. Teeth groupings 38 and 40 extend from one side of the side plate 24 along opposite longitudinal edges thereof. The side plate 24 also includes a third grouping 42 of teeth spaced from the intermediate of the first and second teeth groupings 38 and 40. At least some teeth of the first grouping 38 are engaged with the first chord 28, at least some teeth of the second grouping 40 are engaged with the second chord 30, and at least some teeth of third grouping 42 are engaged with the stiffening members 36.

Figure 3 is a schematic side view of lintel 10. As clearly shown in Figure 3, side plate 24 does not extend the full height of frame 22. Specifically, metal side plate 24 has a width intermediate of the height of frame 22 and the distance between first and second chords 28 and 30, and is positioned so as to overlap portions of each of the coplanar side surfaces of first and second chords 28 and 30 on one side of frame 22, while leaving a sufficient space S1 (eg, about one inch) between its lower longitudinal edge and the bottom edge of frame 22 to permit convenient fastener attachment of siding or other materials.

The metal plate 24 is preferably formed of ASTM A653, Grade 33 or better galvanised sheet steel, and most preferably of such sheet steel with a thickness between 14 and 24 gauge. Such sheet steel material is available in coil form, in various widths, and the metal side plate 24 may be fabricated therefrom, for example, by positioning a portion of the coil of the sheet metal material in a conventional punch press and then simultaneously punching the spaced teeth groupings 38, 40 and 42 to extend from one side of the portion of the sheet metal coil. The punched portion may then be cut off to the desired lintel length. The teeth in the teeth groups 38, 40 and 42 may be of conventional construction such as the teeth of known metal connector plates used to form the joints of metal plate connected wood trusses, but most preferably are of the type employed with the MII20 connector plate marketed by Mitek Industries, Inc. Side plate 24 can be provided to prefabrications of the subject lintel in a roll or pre-cut form in various lengths.

Also as shown in Figure 3, connector plates 44 may be utilised on the side of frame 22 opposite side plate 24. Connector plates 44 typically are located at the interfaces between chords 28 and 30 and stiffening members

36, and such connector plates 44 provide secure engagement between stiffening members 36 and chords 28 and 30.

To fabricate lintel 10, chords 28 and 30 and stiffening members 36 are preferably positioned on an assembly table and jugged in the general outline of frame 22, with connector plates 44 positioned under the interfaces of the chords 28 and 30 and of the stiffening members 36 with their teeth pointed upwardly. Side plate 24 is then located over the other or top side of the chords 28 and 30 and stiffening members 36 so that at least a predetermined number of teeth of first grouping 38 and over first chord 28, of second grouping 40 are over second chord 30 and of third grouping 42 are over stiffening members 36, and so that lower longitudinal edge of the plate 24 is spaced from the lower edge 35 of the frame 22 a distance sufficient to allow convenient nail or screw attachment of siding materials to the chord 30. This spacing is preferably about 1 inch. Side plate 24 and the connector plates 44 are then engaged with chords 28 and 30 and stiffening members 36 by a press or a roller in a manner known in the art. Alternatively, the assembly may be assembled one side at a time and then flipped over for completion of the assembly process.

Lintel 10 provides the advantages of reducing waste and costs. For example, lintel 10 has some excess weight bearing capacity, but lintel 10 does not have excess capacity to the same extent of known composite lintels. Further, side plate 24 reduces the amount of material required to fabricate lintel 10 and therefore reduces the overall cost of lintel 10. In addition, lintel 10 is light weight as compared to known composite lintels made of wood.

Lintel 10 also can be readily pre-fabricated at a factory and delivered to a job site completely assembled.

- Therefore, a skilled carpenter would not be required to make a lintel on-site, which enhances worker productivity. Additionally, the above described metal side plate lintel 10 leaves sufficient space between the side plate lower longitudinal edge and the bottom edge of the frame to permit fastener attachment of siding or other materials to lintel 10 without predrilling the side plate or splitting the lower chord 30 of the frame 22.
- Figure 4 is a perspective view of an alternative lintel 50. As compared to lintel 10, lintel 50 typically would be utilised in lighter load applications. Components of lintel 50 which are identical to components of lintel 10 are referenced to Figure 4 using the same reference numerals used in connection with lintel 10. As compared to lintel 10, lintel 50 includes stiffening members 36 only at opposing ends of frame 22 and the intermediate stiffening members are eliminated. In addition, and with the elimination of the intermediate stiffening members, third grouping 42 of teeth in side plate 24 is eliminated. The side plate 24 also is illustrated with optional stiffening ribs 52 which provide extra rigidity for plate 24.
- Figures 5 and 6 are views of opposing sides of one embodiment of a lintel 100 constructed in accordance with the present invention. Components of lintel 100 which are identical to components of lintel 10 are referenced in Figures 5 and 6 using the same reference numerals used in connection with lintel 10. Lintel 100 includes wood frame 22 and rather than a single metal side plate, a plurality of metal side plates 102 and 104 are positioned at predetermined locations spaced lengthwise along at least one side of frame 22 to provide an opening 106 through which electrical, plumbing or other members may be conveniently passed without the need for drilling or cutting lintel. Side plates 102 and 104 include first,

second and third groups 108, 110 and 112 of teeth to engage chords 28 and 30 and stiffening members 36.

Figure 7 is a schematic side view of a lintel 150
5 constructed in accordance with yet another embodiment of the present invention and having metal side plates 24 installed on both sides of lintel frame 22. Components of lintel 150 which are identical to components of lintel 10 are referenced in Figure 7 using the same reference
10 numerals used in connection with lintel 10. Use of side plates 24 on both sides of frame 22 may be required in applications where lintel 150 is to carry extreme loads. In addition, light weight material can be located in the spaces (not shown in Figure 7) between stiffening members
15 36 before engaging the second plate 24 to frame 22 so that such materials is trapped within lintel 150. Such use of material provides enhanced thermal or sound insulation performance for lintel 150.

20 The various lintel embodiments described above are structural components capable of carrying substantial loads which minimise unnecessary materials, production costs and waste. Such lintels lend themselves to being prefabricated under factory conditions to reduce assembly
25 costs. The lintels are also relatively light weight and easy to handle on-site. In addition, and in each of the various embodiments of the subject lintel described above, a portion of the lintel frame underlying the metal side plate is exposed, enabling convenient attachment of siding
30 or other materials to the lintel.

From the preceding description of various embodiments of the present invention, it is evident that the objects of the invention are attained. Although the invention has
35 been described and illustrated in detail, it is to be clearly understood that the same is intended by way of illustration and example only and is not to be taken by

way of limitation. Accordingly, the spirit and scope of the invention are to be limited only by the terms of the appended claims.

5

A 6x6 grid of dots forming a stylized letter 'A'. The dots are arranged as follows (row by row):
 Row 1: (1,1), (1,2), (1,3), (1,4), (1,5), (1,6)
 Row 2: (2,2), (2,3), (2,4), (2,5)
 Row 3: (3,1), (3,2), (3,3), (3,4), (3,5)
 Row 4: (4,1), (4,2), (4,3), (4,4), (4,5)
 Row 5: (5,1), (5,2), (5,3), (5,4), (5,5)
 Row 6: (6,1), (6,2), (6,3), (6,4), (6,5)

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A lintel including;
a top chord and a bottom chord, the top chord and
5 the bottom chord being formed from wood;
a plurality of wood stiffenings extending between
the top chord and the bottom chord;
a plurality of separate lintel side plates formed
from metal, each lintel side plate extending between and
10 overlapping the top chord and the bottom chord, and the
plurality of lintel side plates extending along the lintel
between one end of the lintel and the other end of the
lintel; and
each lintel side plate having a first grouping of
15 teeth for connecting the lintel side plates to the top
chord, and a second grouping of teeth spaced from the
first grouping of teeth, for connecting the side plates to
the bottom chord.
- 20 2. The lintel of claim 1 where the first and second
groupings are located respectively adjacent first and
second opposed sides of the substantially planar plate
body.
- 25 3. The lintel of claim 1 wherein the first and
second groupings of teeth comprise punched teeth, punched
from and extending from the substantially planar plate
body.
- 30 4. The lintel according to any one of claims 1 to 3
wherein a first stiffening at said one end of the lintel
and a second stiffening at the other end of the lintel of
said plurality of stiffenings, are formed respectively by
a portion of first and second vertical studs which are
35 formed in a framing construction in which the lintel is
installed.

Dated this 11th day of April 2001

MITTEK HOLDINGS, INC

5 By their Patent Attorneys

GRIFFITH HACK

**Fellows Institute of Patent and
Trade Mark Attorneys of Australia**

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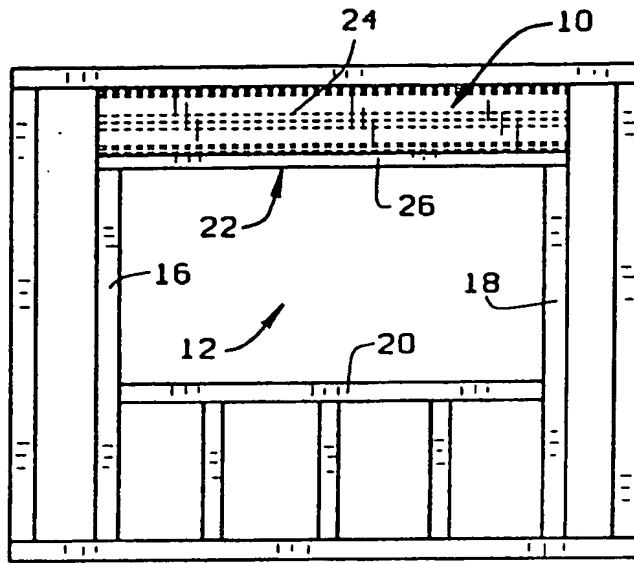


FIG. 1

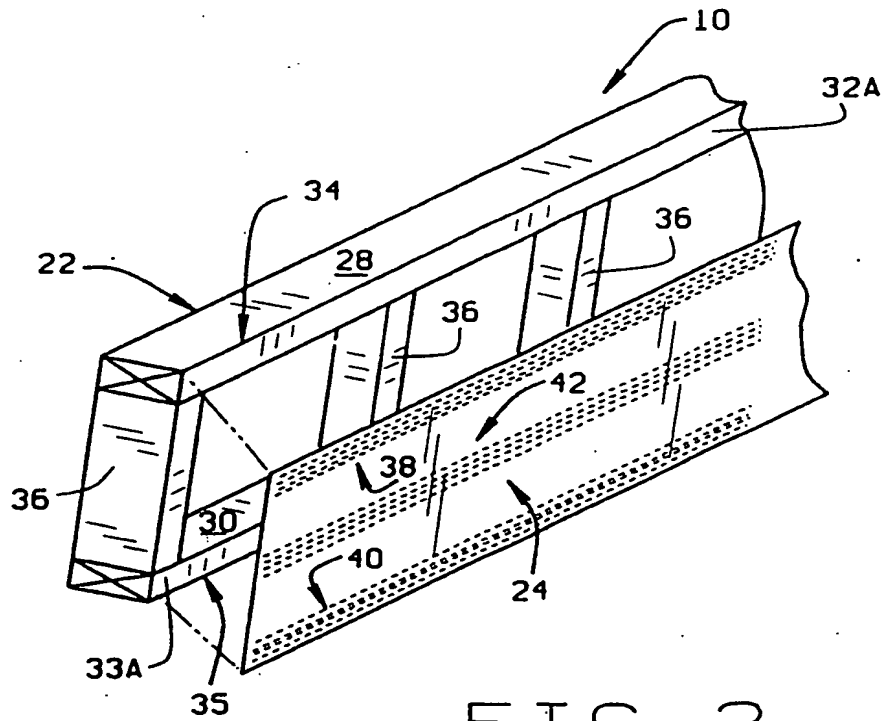


FIG. 2

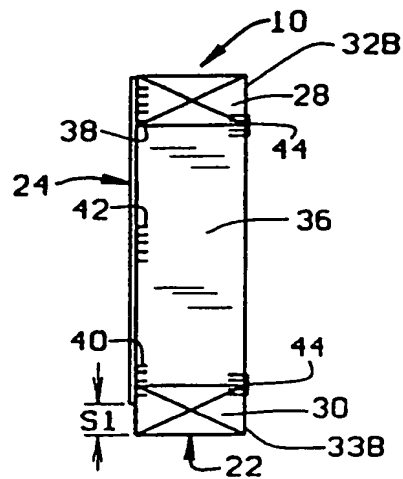


FIG. 3

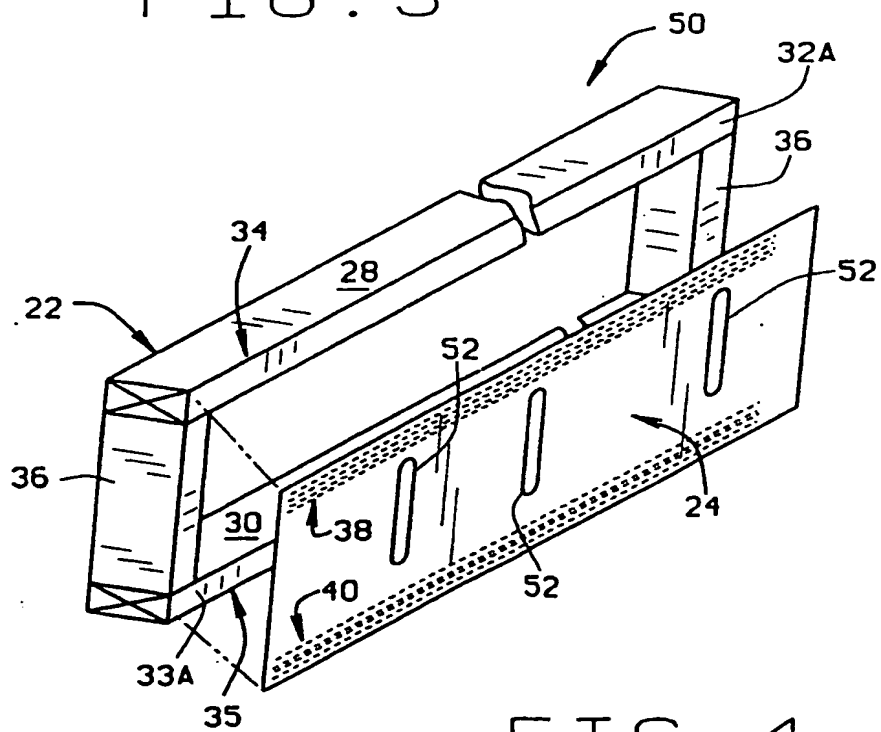


FIG. 4

3/3

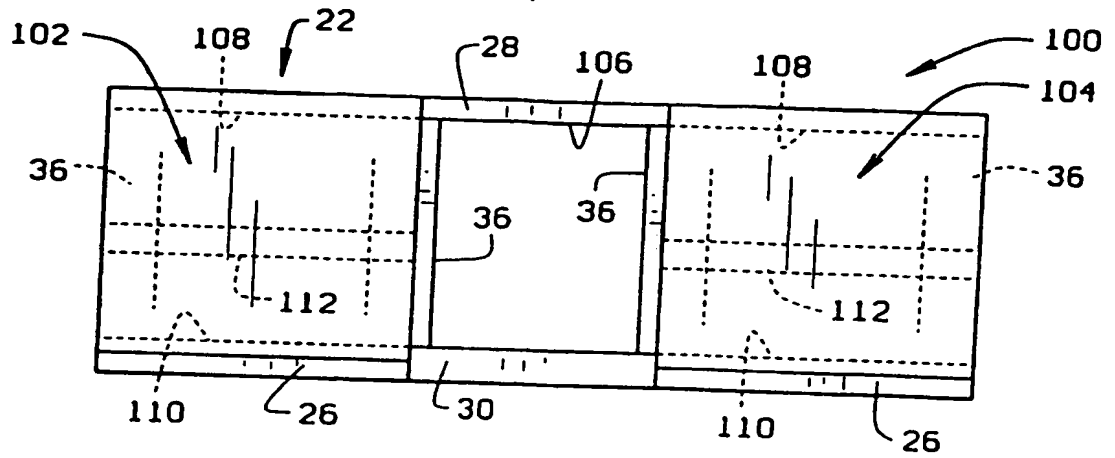


FIG. 5

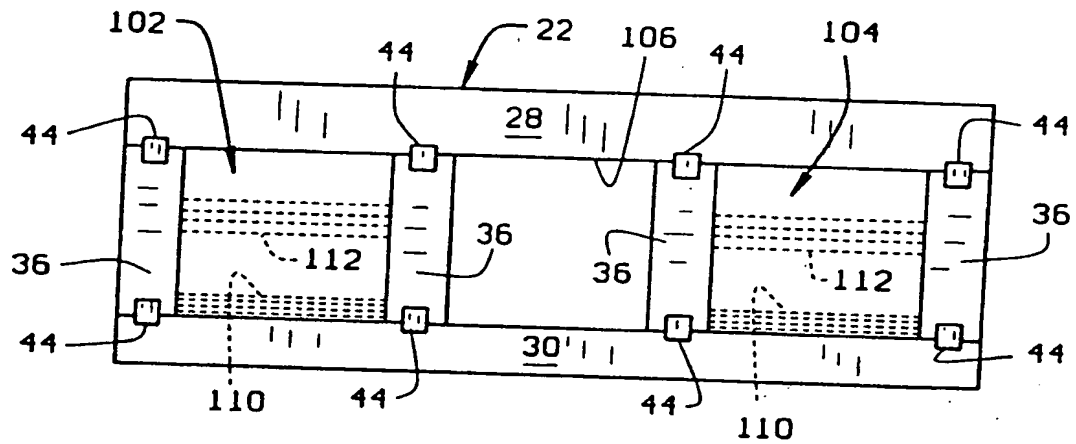


FIG. 6

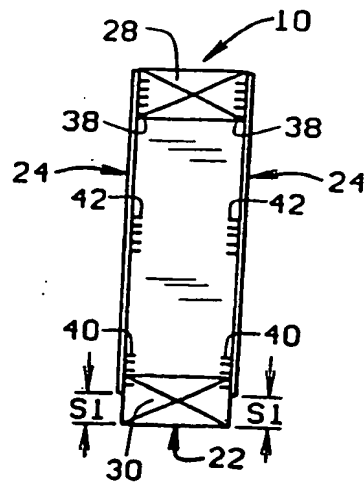


FIG. 7

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